

**GMA**

**Group of Medical Advisers**

**GCM**

**Groupe des conseillers médicaux**





#### GMA REPORTS

Since the 1950's, the Atomic Energy Control Board (AECB) has made use of advisory committees of independent experts to assist it in its decision-making process. In 1979, the Board restructured the organization of these consultative groups, resulting in the creation of two senior-level scientific committees, the Advisory Committee on Radiological Protection (ACRP), and the Advisory Committee on Nuclear Safety (ACNS). A third body of advisers, known as the Group of Medical Advisers (GMA), is composed of medical practitioners licensed under the laws of the province in which regulated nuclear activities are situated. Medical Advisers are nominated by the appropriate department or agency and appointed by the Board pursuant to the *Atomic Energy Control Regulations*. They make recommendations to the Board respecting, inter alia, the medical examination of atomic radiation workers, medical surveillance required as a result of overexposures, and medical aspects of emergency plans.

From time to time the GMA issues reports which are normally published by the AECB and catalogued within the AECB's public document system. These reports, bound with a distinctive cover, carry both a group-designated reference number, e.g. GMA-1, and an AECB reference number in the "INFO" series. The reports generally fall into two broad categories: (i) recommendations to the AECB on a particular medical topic, and (ii) background studies. Unless specifically stated otherwise, publication by the AECB of a report prepared by the Group of Medical Advisers does not imply endorsement by the Board of the content, nor acceptance of any recommendations made therein.

#### RAPPORTS DU GCM

Depuis les années cinquante, la Commission de contrôle de l'énergie atomique (CCEA) fait appel à des comités consultatifs composés d'experts indépendants pour l'aider dans ses prises de décisions. En 1979, la CCEA a restructuré l'organisation de ces groupes de consultation pour former deux comités scientifiques supérieurs, le Comité consultatif de la radioprotection (CCRP) et le Comité consultatif de la sûreté nucléaire (CCSN). Un troisième groupe, le Groupe des conseillers médicaux (GCM), est formé de médecins agréés pour la pratique de la médecine en vertu des lois de la province dans laquelle se tiennent des activités nucléaires réglementées. Le ministère ou l'organisme compétents proposent le nom de conseillers médicaux qui sont ensuite nommés par la CCEA en vertu du *Règlement sur le contrôle de l'énergie atomique*. Ces conseillers font des recommandations à la CCEA concernant, entre autres, l'examen médical des travailleurs sous rayonnements, la surveillance médicale nécessaire en cas de surexposition et les aspects médicaux des plans d'urgence.

Le GCM rédige à l'occasion des rapports qui sont normalement publiés par la CCEA et catalogués dans sa collection des documents publics. Ces rapports se présentent sous une couverture distincte et portent un numéro de référence propre au comité (GCM-1, par exemple), ainsi qu'un numéro de référence de la CCEA dans la série «INFO». Ils se divisent habituellement en deux catégories générales : i) les recommandations présentées à la CCEA au sujet d'une question médicale particulière; ii) les études générales. À moins d'indication contraire, la publication par la CCEA d'un rapport du Groupe des conseillers médicaux ne signifie pas qu'elle en approuve le contenu, ni qu'elle en accepte les recommandations.

**GMA**

**GCM**

**INFO-0709(E)**

**Group of Medical Advisers**

**Groupe des conseillers médicaux**

**GMA-14**

**Guidelines for Community Hospitals  
in the Handling of  
Radiation Accident Patients**

**by the**

**Group of Medical Advisers  
to the  
Atomic Energy Control Board**

**September 1999**

Secretariat, Group of Medical Advisers, Atomic Energy Control Board, P.O. Box 1046, Ottawa, Canada K1P 5S9

Secrétariat, Groupe des conseillers médicaux, Commission de contrôle de l'énergie atomique, C.P. 1046, Ottawa, Canada K1P 5S9



## Executive Summary

This document is a revision of a 1992 publication of the Atomic Energy Control Board's (AECB) Group of Medical Advisers entitled "*GMA-3, Guidelines on Hospital Emergency Plans for the Management of Minor Radiation Accidents*". GMA-3 was primarily intended for emergency planners. It provided guidance on organizational structure, personnel, facilities, equipment, supplies and treatment principles that are required for the initial care of injured persons who have been contaminated with radioactive materials.

In the Spring and Summer of 1995 a survey of Canadian Hospitals Radiation Emergency Plans was commissioned by the Group of Medical Advisers to determine the usefulness of the GMA-3. In general, the document was considered a useful tool by the respondents. However, the majority of hospitals did not consider a radiation emergency plan a very high priority and could not afford the cost associated with training staff, purchasing equipment, and exercising the plan. For the rare radiation accident patient who might present at the emergency department it would be more practical to have easy-to-follow procedures to manage such cases, procedures that do not require much training or specialized equipment. The majority of hospitals are located in areas where there is little specialized support for radiation accidents. Hospitals in large centres usually do have access to equipment and staff with specialized training, while hospitals located close to nuclear power plants have radiation emergency plans in place, exercise these plans, train staff, and have support from health physicists and others when dealing with radiation accidents.

This document, *Guidelines for Community Hospitals in the Handling of Radiation Accident Patients*, was developed by a private contractor under the direction of the Group of Medical Advisers. It provides procedures for the reception, treatment and transfer of patients who may have been contaminated by radioactive materials or exposed to radiation from industrial sources or transportation accidents. Specialized training and equipment, while desirable, is not necessary for the initial treatment of radiation accident victims. When handling contaminated patients, it is possible to minimize the exposure to workers and limit the spread of contamination through the use of universal precautions.

## Sommaire

Ce document est une révision de la publication de 1992 du Groupe des conseillers médicaux de la Commission de contrôle de l'énergie atomique (CCEA) intitulée « *GCM-3, Lignes directrices pour les plans d'urgence des hôpitaux aux fins de la gestion des accidents radiologiques mineurs* ». Le GCM-3 fut rédigé principalement à l'intention des planificateurs des mesures d'urgence. Il se voulait un guide en matière de structure organisationnelle, de personnel, d'installations, d'équipement et de principes de traitement pour les soins initiaux aux personnes contaminées par des substances radioactives.

Au cours du printemps et de l'été 1995, le Groupe des conseillers médicaux a commandé un sondage portant sur les plans d'urgence radiologiques des hôpitaux canadiens dans le but de déterminer l'utilité du GCM-3. Dans l'ensemble, les répondants ont trouvé le document utile. Cependant, la majorité des hôpitaux estimaient qu'un plan d'urgence radiologique ne constituait pas une priorité et ne pouvaient pas se permettre les coûts associés à la formation du personnel, à l'achat de l'équipement et à la mise en oeuvre d'un plan. Pour les rares victimes d'accidents radiologiques qui se présentent à la salle d'urgence, il leur semblait plus pratique de disposer de procédures simples qui ne nécessitent pas beaucoup de formation ou d'équipement spécialisé. La majorité des hôpitaux sont situés dans des régions offrant peu de support spécialisé pour les accidents radiologiques. Les hôpitaux des grands centres ont habituellement accès à l'équipement nécessaire et à du personnel possédant une formation spécialisée alors que les hôpitaux situés près des centrales nucléaires ont des plans d'urgence forment le personnel et obtiennent le support de nombreux spécialistes, entre autre ceux en radioprotection, lorsqu'ils font face à des accidents radiologiques.

Le présent document, *Lignes directrices pour les hôpitaux communautaires sur le traitement des victimes d'accident radiologique*, fut élaboré par un entrepreneur privé sous la direction du Groupe des conseillers médicaux. Il propose des procédures pour l'accueil, le traitement et le transfert de patients qui pourraient avoir été contaminés par des substances radioactives ou exposés à des rayonnements provenant de sources industrielles ou d'un accident de transport. La formation et l'équipement spécialisés, bien que souhaitables, ne sont pas essentiels pour le traitement initial des victimes d'accidents radiologiques. En traitant les patients contaminés, il est possible de minimiser l'exposition des employés et de limiter la dispersion de la contamination en utilisant des précautions universelles.

## **Guidelines for Community Hospitals in the Handling of Radiation Accident Patients**

### **CONTENTS**

	<u>Page</u>
Executive Summary .....	iii
<b>PART 1 - INTRODUCTION</b> .....	<b>1</b>
1. GENERAL .....	1
2. PURPOSE .....	1
3. SCOPE .....	1
4. WHEN TO USE THE PROCEDURES .....	2
5. HOW TO USE THE PROCEDURES .....	2
6. GLOSSARY OF RADIOLOGICAL TERMS .....	2
<b>PART 2 - PROCEDURES</b> .....	<b>6</b>
PROCEDURE 1. PREPARATION .....	6
PROCEDURE 2. TREATING A CONTAMINATED PATIENT .....	11
PROCEDURE 3. TREATING AN OVEREXPOSED PATIENT .....	16
PROCEDURE 4. CLEAN UP .....	19
ACKNOWLEDGEMENTS .....	22
APPENDIX 1: EXAMPLE OF A RADIATION TREATMENT AND DECONTAMINATION AREA .....	23
APPENDIX 2: TREATING A CONTAMINATED PATIENT (RADIOACTIVE) .....	24



*Part 1*  
*Introduction*



## **PART 1 - INTRODUCTION**

### **1. GENERAL**

The guidelines presented here are applicable to small hospitals, especially those with little or no radiation capabilities who could receive minor radiation accident casualties from industrial users, or resulting from transportation accidents.

### **2. PURPOSE**

The purpose of this guide is to provide general guidelines for the reception, treatment and transfer of patients who may have been contaminated by, or overexposed to, radioactive materials.

### **3. SCOPE**

The material contained in the guidelines is intended for the treatment of patients suffering from conventional injuries with radioactive contamination or radiation exposure as a complicating factor. It does not provide guidance on the treatment of acute radiation syndrome.

The Guide provides general information in the form of procedures covering the following areas:

- **Preparation:**
  - notification;
  - activation of staff;
  - where to call for guidance;
  - preparation of equipment (if available);
  - set up of radiation emergency area;
  - dressing of staff ;
  - review of radiation protection procedures with staff; and
  - patient reception.
- **Handling a Contaminated Patient:**
  - assessment;
  - treatment of medical condition;
  - decontamination of patient; and
  - transfer of patient.

- **Treating an Overexposed Patient:**
  - recognition of possible overexposure;
  - medical treatment;
  - biological samples; and
  - referral to specialized care.
- **Clean Up:**
  - clean up of the radiation emergency area;
  - undressing of staff; and
  - survey.

#### 4. WHEN TO USE THE PROCEDURES

The procedures in this Guide should be used whenever a patient is known or suspected to be radiologically contaminated or overexposed.

#### 5. HOW TO USE THE PROCEDURES

The procedures are intended as a tool to assist hospital administrative and medical staff to receive and treat emergency radiation accident patients. Hospitals should adapt these procedures to suit their particular needs and local environment. The procedures may be incorporated, in whole or in part, into existing emergency contingency plans. Alternatively, the Guide may be adopted as a stand alone document.

#### 6. GLOSSARY OF RADIOLOGICAL TERMS

##### **Absorbed Dose**

The energy imparted to a body by ionizing radiation, per unit mass, at the place of interest. The unit of absorbed dose is the Gray (Gy).

##### **Acute Radiation Syndrome**

The collective term for the whole body response to radiation; a group of signs and symptoms that develop after high, whole body radiation exposures, of short duration. The clinical course is predictable, and dependent on the nature and extent of the exposure.

**Background Radiation**

The natural baseline levels of radiation arising from cosmic rays, substances in the earth, and from every living thing.

**Contamination**

Radioactive material anywhere it is not supposed to be - in a location where it is not wanted. When an individual comes into contact with radioactive material in the form of airborne particles, liquid or powder, the individual may be "contaminated".

**Decontamination**

The reduction or removal of radioactive material from a location where it is not wanted.

**Dose**

A general term for the quantity of radiation or energy imparted to and absorbed in a material from a radiation source - this energy may appear as ionization, excitation or changes in chemical bonding structure (producing tissue damage and haematological changes) or as heat (producing skin burns).

**Dosimeter**

Instruments or devices used to measure the dose of ionizing radiation received by an individual (i.e., instant read pocket dosimeter, TLD, film badge, etc.)

**Exposure**

In this context, a person who is "exposed" is someone who has been subjected to radiation from a radioactive material or from a radiation source such as an x-ray machine.

**External Contamination**

Occurs when radioactive material is deposited on a body and/or on clothing. Usually loose and particulate, or powder form, and readily removed by decontamination.

<b>External Irradiation</b>	Occurs when a radioactive source emits radiation as waves or streams of subatomic particles, ordinarily termed the "radiation field".
<b>Internal Contamination</b>	Occurs as a person ingests or inhales radioactive material. Internal contamination is always treated under medical supervision.
<b>Ionizing Radiation</b>	Any electromagnetic or particulate radiation capable of producing ions, directly or indirectly, when passing through matter.
<b>Irradiation</b>	Exposure to ionizing radiation.
<b>KI (potassium iodide)</b>	A chemical form of stable iodine which may be used to block absorption of radioiodine by the thyroid gland.
<b>Radiation</b>	The energy moving through space in the form of particles, or as rays or waves, i.e., electromagnetic waves. The radiation is classed according to the frequency and wavelength, as: infrared, visible (light), ultraviolet, x-rays and gamma rays.
<b>Radioactive Material</b>	Material which spontaneously emits particles or rays.
<b>Thermoluminescent Dosimeter</b>	An accurate device used to measure radiation and provide a permanent record of exposure to radiation.
<b>X-ray</b>	Radiation originating from the electron cloud rather than from the nucleus of an atom. One form of electromagnetic radiation.

*Part 2*  
*Procedures*

## PART 2 - PROCEDURES (see Appendix 2)

### PROCEDURE 1. PREPARATION

#### 1-1. Brief first responders:

1. look for a dosimeter; if the casualty is wearing one to bring it with them
2. if the patient has not been contaminated there is NO RADIOLOGICAL HAZARD and no particular radiological precautions during handling or treatment are required
3. if the patient is contaminated special precautions are needed; assume the patient is contaminated, if not known
4. all persons, materials, equipment and vehicles that have contact with a suspected or confirmed contaminated patient must be assessed for contamination and, if necessary, decontaminated
5. life saving medical interventions always take precedence over radioactive decontamination
6. secondary radiation exposure from handling contaminated patients is usually low

#### 1-2. Get the following information, if available.

1. extent and type of injuries
  - ☐ whole body or localized irradiation, with or without trauma
  - ☐ known or suspected external radiation contamination, with or without trauma
  - ☐ known or suspected internal radiation contamination, with or without trauma
2. any information from the incident site that might identify the type of contamination/exposure, e.g. accident report, packaging/labels, manifest

**1-3. Assume patient to be contaminated if status unknown.**

**1-4. Call the AECB, provincial authorities or other qualified resources for advice and assistance.**

- |    |  |                |
|----|--|----------------|
| 1. | AECB Duty Officer (24 hours)   | (613) 995-0749 |
| 2. | Health Canada, Health Protection Branch<br>Medical Adviser (business hours)    | (613) 941-3320 |
| 3. | Health Canada, Health Protection Branch<br>Duty Officer (after business hours) | 613) 954-6651  |
| 4. | CANUTEC (24 hours)   | (613) 996-6666 |
| 5. | Provincial authorities   |                |
| 6. | other qualified resources (e.g., university)                                   |                |

**1-5. Notify required staff of impending arrival of potentially contaminated and/or overexposed patient.**

- |    |   |
|----|---|
| 1. | emergency medical staff   |
| 2. | personnel who have radiation safety training  |
| 3. | hospital housekeeping and security staff  |
| 4. | patient administration (registration)   |
| 5. | personnel who normally receive and respond to inquiries from the media<br>(switchboard operators, hospital administrator) |



**1-6. Prepare equipment and supplies.**

1. radiation detection meters, if available
  - ☐ turn on, check battery level
  - ☐ check calibration
2. direct reading and/or thermoluminescent dosimeters, if available
3. general supplies:
  - ☐ aprons
  - ☐ gowns
  - ☐ scrub pants
  - ☐ overshoe covers
  - ☐ head covers
  - ☐ masks
  - ☐ extra gloves
  - ☐ tape (for delineating radiation emergency area)
  - ☐ containers/bags with labels (for contaminated supplies and clothing)
4. medical supplies
5. wash basin and body cleansing supplies

**1-7. Set up radiation emergency area.**

*If the patient's injuries are life-threatening, the patient should be immediately treated using UNIVERSAL PRECAUTIONS. Treatment should only be delayed for set up of the radiation emergency area when injuries are non life-threatening.*

1. determine the area to be used (it is **not** necessary to reserve a particular area on a continual basis)
2. determine background radiation level, if equipment and appropriately trained personnel available
3. segregate the area by using signs and tape (see Appendix 1)
  - any tape will do, however, yellow plastic tape marked with **"RADIATION - DO NOT ENTER"** is preferable
4. establish traffic flow pattern and clean/dirty line (see Appendix 1)
5. remove all non-essential equipment and supplies, or cover with plastic
6. ensure all equipment and supplies for patient treatment are available in dirty area
7. ensure containers for contaminated supplies are available in dirty area

**1-8. Get dressed.**

1. put on shoe covers and tape to pant cuffs
2. put on gloves and tape to shirt cuffs
3. put on scrub pants and gown and tape cuffs
4. put on overshoe covers
5. put on outer apron and gown
6. clip dosimeter, if available, to pocket of gown
7. put on head cover and mask
8. put on second pair of gloves; **DO NOT** tape to cuffs, these gloves should be replaced frequently during patient treatment to reduce the spread of contamination

**1- 9. Review radiation protection procedures with staff.**

1. provide situation briefing (information from Procedure 1-1.)
2. review contamination/exposure control procedures:
  - ☐ female staff who are confirmed pregnant may attend cases of external irradiation but should not handle contaminated patients
  - ☐ concept of clean/dirty area; clean personnel remain in clean area, dirty personnel remain in dirty area
  - ☐ keep numbers of personnel in dirty area to a minimum, sufficient only to provide appropriate care
  - ☐ minimize number of personnel in contact with contaminated patient
3. review the use of radiological survey instruments, if equipment and appropriately trained personnel are available
4. review individual responsibilities

**PROCEDURE 2. TREATING A CONTAMINATED PATIENT****2-1. Receive patient.**

1. if notified in advance, it is preferable to meet the patient at the ambulance or other transporting vehicle at a pre-designated area outside the hospital and away from normal entrances
2. if above is not possible, when patient is suspected or known to be contaminated, immediately quarantine the patient
3. the path used for a contaminated patient should be cordoned off until contamination verification is performed
4. conduct contamination assessment, if equipment and appropriately trained personnel available; if unable to confirm, assume contaminated
5. quarantine ambulance (transporting vehicle), equipment and personnel until contamination assessment and, if necessary, decontamination of vehicle, equipment and/or personnel is completed
6. remove any thermoluminescent and/or direct reading dosimeter, if any, and label with patients name, date and time and retain for analysis
7. remove patient clothing and other articles and discard into labelled containers
8. cover open wounds and cover the patient to prevent contamination spread
9. move patient to radiation emergency area

**2-2. Assess medical condition.**

1. determine medical priorities
2. determine site(s) and extent of trauma injury, if any
3. identify potential radiological hazard(s), if possible
4. get a patient history, particularly previous radiological exposure, if possible

**2-3. Treat medical condition.**

1. deliver critical care and stabilize patient (**always** a priority over radiation concerns)
2. ensure any dosimeter on the patient is removed prior to x-ray

**2-4. Collect samples for radiological analysis.****if suspected external contamination:**

body orifice (nose, mouth, ears, eyes) swabs; use cotton-tipped applicator or gauze and store in clean container

- ☐ wound swabs
- ☐ skin wipes

**if suspected internal contamination:**

- ☐ urine (24 hour specimen x 4 days)
- ☐ faeces (x 4 days)
- ☐ vomitus
- ☐ sputum (deep cough specimen)
- ☐ blood

**2-5. If time permits, treat internal contamination.**

This is specialized treatment and treatment advice should be sought from radiological authorities or specialists (see Procedure 1-4)

- ☐ **acute ingestion:** gastric lavage as for poisoning
- ☐ **tritium inhalation or ingestion:** fluid diuresis, water, 6-12 litres per day
- ☐ **radioiodine inhalation or ingestion:** potassium iodide (KI) or perchlorate
- ☐ **phosphate ingestion:** fluid diuresis, water, 6-12 litres per day
- ☐ **metal isotope ingestion:** gaviscon or neutraphos, bicarbonate

**2-6. Treat non-critical trauma injuries**

## 2-7. Decontaminate patient.

*Decontamination should only be as thorough as practical. Usually, most radioactive material is removed in the first decontamination effort. Retain samples of irrigation fluids for analysis.*

1. severe wounds and burns
  - ☐ **drape** the affected area, preferably with a waterproof material, to isolate the contamination
  - ☐ **irrigate** the wound for approximately 15 minutes with normal saline, water or 3% hydrogen peroxide solution
  - ☐ **remove** embedded radioactive particles, if visible, with forceps or a waterpik device
  - ☐ **swab** the wound gently with cotton-tipped applicator or gauze; label the swab with wound location and time and retain for analysis in clean container
  - ☐ **cover** the wound with a waterproof dressing
2. orifices
  - ☐ **rinse the mouth** with a 3% citric acid solution after brushing patients' teeth and oral cavity with toothpaste
  - ☐ **irrigate the nose** with tap water or saline
  - ☐ **rinse the ears** externally, and rinse the auditory canal using an ear syringe provided the tympanic membrane is intact
  - ☐ **rinse the eyes** by directing a stream of sterile water or saline from the inner canthus to the outer canthus of each eye, while avoiding contamination of the nasolacrimal duct
3. surface wounds and burns
  - ☐ as above for severe wounds and burns
4. remaining skin area starting with most severely contaminated, if known
  - ☐ **dry decontamination** by brushing, application of adhesive tape to strip particles or very fine sand paper may be used on extremities if more aggressive measures are required (useful for small skin areas and loose, visible particles)
  - ☐ **wet decontamination**, if patient is conscious, ambulatory and injuries are non life-threatening, may be directed to shower with lukewarm water, or for severely injured or non-ambulatory, washing with copious amounts of lukewarm water
5. collect biological samples, package in clean containers, label, and retain for analysis



**2-8. Transfer patient.**

1. conduct whole body radiological survey at control line, if instrument available
2. if instrument unavailable, re-swab all areas and retain swabs for post-decontamination analysis
3. transfer patient to clean area
4. clean team transfers patient to outside

**2-9. Refer to specialized care.**

1. consult with radiological authorities and specialists for advice and assistance (see procedure 1- 4.)
2. transfer to a specialized facility, if required (severe external irradiation and/or external or internal contamination)
3. provide accurate and detailed information regarding the accident and any treatment provided to specialized facility when the patient is transferred

**PROCEDURE 3. TREATING AN OVEREXPOSED PATIENT****NOTE :**

- ☐ **If patient is suspected to be contaminated, go to procedure 2**
- ☐ **If patient is overexposed, but not contaminated, there is no hazard to medical personnel, and treatment should be symptomatic**

**3-1. Receive patient.**

1. **meet the patient at the ambulance or other transporting vehicle at pre-designated area outside the facility and away from normal entrances**
2. **remove any dosimeter, if any, and retain for analysis**

**3-2. Assess medical condition.**

1. determine medical priorities
2. determine site(s) and extent of trauma injury, if any
3. recognize possible overexposure
  - ☐ nausea
  - ☐ disorientation
  - ☐ dizziness
  - ☐ anorexia
  - ☐ latent skin burns
4. if trauma injuries permit
  - ☐ get a patient history, particularly previous radiological exposure, if possible
  - ☐ conduct a complete physical examination
  - ☐ determine which symptoms are present and time of onset since alleged exposure

**3-3. Treat medical condition requiring immediate care.**

**3-4. Take biological samples.**

1. consult with radiological authorities and specialists for advice and assistance (see procedure 1-4)
2. blood
  - ☐ full blood count, CBC (including absolute lymphocyte count)
  - ☐ biochemical analysis
  - ☐ radionuclide content
  - ☐ cytogenetic analysis (can be done after 24 hours, unique test not readily available)
3. urine
  - ☐ biochemical analysis
  - ☐ radionuclide content (24 hour specimen x 4 days)

**3-5. Refer to specialized care for overexposure.**

1. consult with radiological authorities and specialists for advice and assistance (see procedure 1-4)
2. transfer to a specialized facility, if required (severe external irradiation )
3. provide accurate and detailed information regarding the accident and any treatment provided to specialized facility when the patient is transferred

**PROCEDURE 4. CLEAN UP****4-1. Clean up radiation emergency area.**

1. segregate all equipment and supplies
2. collect all equipment in container(s) clearly marked  
**"RADIOACTIVE - DO NOT DISCARD"**
3. collect all supplies in bags clearly labelled  
**"RADIOACTIVE - DO NOT DISCARD"**
4. place marked bags and containers in a secure storage area and retain until surveyed for contamination
5. wash down radiation emergency area
6. for disposal, contact company responsible for the site of the accident or seek advice from the Atomic Energy Control Board (see Procedure 1-4.)

#### 4-2. Undress in dirty area.

1. remove outer gloves first, turning inside out
2. remove any dosimeter, if present, and retain for analysis
3. remove tape at cuffs of sleeves and pants
4. remove outer apron and gown, turning inside out
5. remove gown, turning inside out
6. remove scrub pants and over shoe covers, turning inside out
7. remove mask and head cover
8. remove tape from shoe covers
9. remove shoe cover, with assistance, from one foot while facing into the treatment room, survey footwear for contamination, if instrument available, then place that foot over control line; repeat for other foot
10. remove inner gloves
11. survey whole body for contamination, if instrument available
12. shower if contamination detected or no instrument available; use lukewarm water
13. retain all clothing in bags or containers clearly labelled **"RADIOACTIVE - DO NOT DISCARD"** and launder as per normal procedure, but in separate loads from regular laundry
14. Step into the shower area and thoroughly wash
15. Monitor whole body before leaving the shower area

**4-3. Survey facility.**

1. conduct a thorough contamination survey, if survey instruments and appropriately trained personnel are available
2. if above not available, contact radiological authorities or other qualified resources to conduct contamination survey (see procedure 1-4)

**4-4. Restore facility:**

1. remove access controls signs and tape
2. advise emergency medical staff that radiation emergency area has been returned to normal operation
3. advise hospital security staff that radiation emergency area has been returned to normal operation
4. advise hospital administration that radiation emergency area has been returned to normal operation



## **ACKNOWLEDGEMENTS**

### **Members, Medical Advisers' Working Group-2:**

Dr. S. Vlahovich, Chair, Group of Medical Advisers  
Dr. M. McQuigge, Chair, MA-WG-2  
Ms. S. Carson  
Ms. B. MacDonald  
Dr. H. Gasmann  
Dr. J. Hébert

All members of the Group of Medical Advisers to the Atomic Energy Control Board.

### **Contractor:**

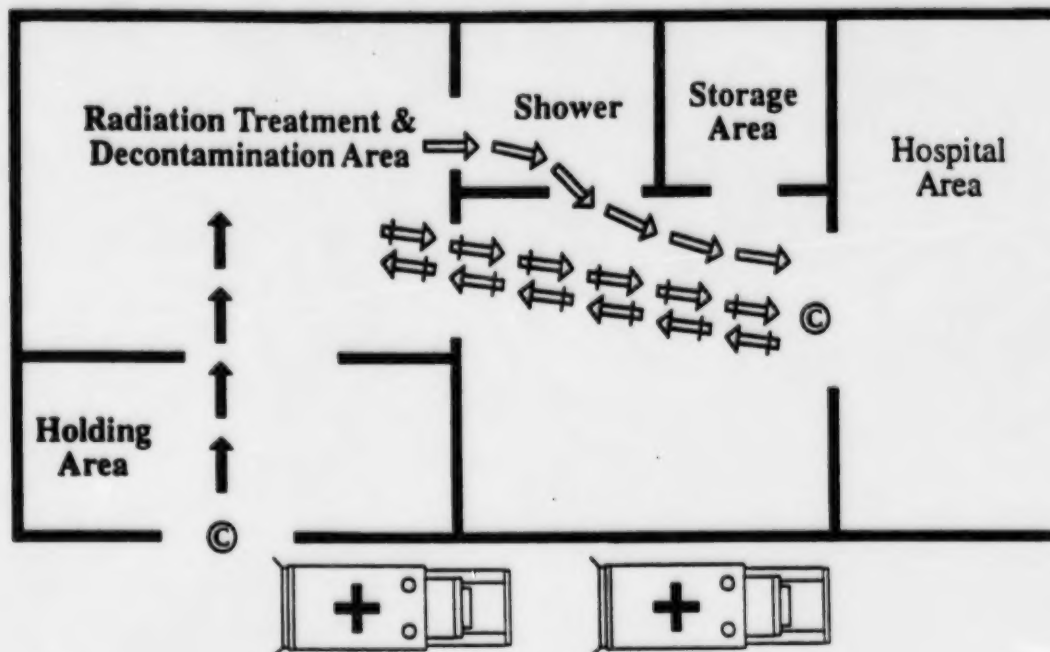
Science Applications International Corporation (SAIC Canada)

### **Secretariat:**

Mr. M.W. Lupien (Scientific Secretary)  
Ms. P.A. Kempf

## APPENDIX 1

### EXAMPLE OF A RADIATION TREATMENT AND DECONTAMINATION AREA



#### Legend

- Contaminated Patient →  
Decontaminated Patient ⇨  
Hospital Emergency and Treatment Staff ⇄  
Access Control and Radiological Monitoring Point ©

# APPENDIX 2: TREATING A CONTAMINATED PATIENT (RADIOACTIVE)

DO NOT DELAY TREATMENT FOR LIFE THREATENING INJURIES  
USE FULL UNIVERSAL PRECAUTIONS WHEN HANDLING A CONTAMINATED PATIENT

